CLAIMS

Now, therefore, the following is claimed:

1. A system which controls appliances comprising:

at least one first transceiver identified by an identification code and configured to receive a radio frequency (RF) demand reduction control signal having the identification code;

at least one appliance controller unit, the appliance controller unit coupled to at least one appliance and the first transceiver;

an appliance controller unit memory residing in the appliance controller unit, the appliance controller unit memory configured to have a unique identification code identifying the appliance controller unit such that when the RF demand reduction control signal identification code corresponds to the appliance controller unit unique identification code, the appliance coupled to the appliance controller unit is shut off;

a second transceiver coupled to a meter, the meter coupled to the appliance, and the second transceiver configured to generate a second RF signal corresponding to an amount of demand detected by the meter; and

a plurality of network transceivers configured to communicate the second RF signal to an energy management controller that initiated the RF demand reduction control signal.

2. The system of claim 1, wherein the second transceiver generates the second RF signal corresponding to the amount of demand detected by the meter before the RF demand reduction control signal is received, and wherein the second transceiver generates a third RF signal corresponding to the amount of demand detected by the meter after the appliance coupled to the appliance controller unit is shut off.

3. The system of claim 1, wherein the second transceiver determines a change in demand corresponding to the amount of demand detected by the meter before the RF demand reduction control signal is received and the amount of demand detected by the meter after the appliance coupled to the appliance controller unit is shut off, such that the second RF signal corresponds to the determined change in demand.

4. The system of claim 1, wherein the transceiver is a radio frequency (RF) transceiver.

5. The system of claim 1, further comprising an appliance controller coupled to the appliance and configured to generate a shut-off control signal in response to the RF demand reduction control signal so that the appliance is shut off.

6. The system of claim 1, further comprising an appliance controller power switch coupled to an electrical source of the appliance and configured to shut off power to the appliance in response to the RF demand reduction control signal so that the appliance is shut off.

7. The system of claim 1, further comprising a plurality of appliances controllers, each one of the appliance controllers coupled to at least one of a plurality of appliances and configured to generate a shut-off control signal in response to the RF demand reduction control signal so that the appliances are shut off.

8. The system of claim 7, wherein each one of the plurality of appliance controllers is associated with a unique appliance controller identification code such that when an identification code portion of the RF demand reduction control signal corresponds to the unique appliance controller identification code, the respective appliance controller generates the shut-off control signal.

9. The system of claim 1, further comprising a notification interface configured to generate a notification communication signal in response to a notification control signal received from the energy management controller, the generation of the notification control signal occurring before the RF demand reduction control signal is received by a predefined amount of time, such that the notification communication signal is communicated to a customer device such that a customer understands that the appliance will be shut off at a future time, the future time substantially corresponding to the predefined amount of time.

10. The system of claim 1, further comprising a light configured to generate a light signal in response to a notification control signal received from the energy management controller, the generation of the notification control signal occurring before the RF demand reduction control signal is received by a predefined amount of time, such that the light signal is communicated to a customer so that the customer understands that the appliance will be shut off at a future time, the future time substantially corresponding to the predefined amount of time.

11. The system of claim 1, further comprising an interface coupled to the appliance controller unit memory and configured to receive at least the unique identification code identifying the appliance controller unit and further configured to transmit the unique identification code to the appliance controller unit memory for storage.

12. The system of claim 1, further comprising:

a first interface coupled to the energy management controller and a communication network; and

a second interface coupled to a site controller and the communication network, the site controller configured to communicate at least the second RF signal such that communications between the energy management controller and the site controller are communicated over the communication network.

13. The system of claim 12, wherein the communication network is a public switched telephone network.

14. The system of claim 12, wherein the communication network is a utility legacy communication system.

15. The system of claim 12, wherein the communication network is a digital communication system.

16. The system of claim 12, wherein the communication network is a radio frequency (RF) communication system.

17. The system of claim 12, wherein the communication network is an Internet network.

18. A system for controlling demand in an energy delivery system, comprising:

means for generating a demand reduction control signal by an energy management controller;

means for transmitting a first radio frequency (RF) signal corresponding to the demand reduction control signal generated by the energy management controller to a plurality of first transceivers, one first transceiver residing in one of a plurality of appliance control units, wherein each one of the plurality of appliance control units is coupled to at least one appliance;

means for shutting off the appliance coupled to the appliance control unit in response to receiving the first RF signal;

means for metering a first change in demand at a plurality of meters, each one of the meters coupled to one of the appliances;

means for transmitting a plurality of second RF signals each corresponding to one of the plurality of first changes in demand to the energy management controller from a plurality of second transceivers, each one of the second transceivers coupled to one of the plurality of meters; and

means for determining a first aggregate change in demand, the first aggregate change in demand equaling a sum of the plurality of first changes in demand.

19. The system of claim 18, further comprising:

means for assigning a unique identification code to each one of the plurality of appliance control units;

means for selecting a plurality of identification codes such that selected ones of the plurality of appliance control units are selected; and

means for receiving the first RF signal corresponding to the generated demand reduction control signal by the selected ones of the plurality of appliance control units perform the step of shutting off each one of the appliances coupled to the selected ones of the plurality of appliance control units.

20. The system of claim 18, further comprising means for communicating the demand reduction control signal through a communication network from the energy management controller to a site controller such that the site controller transmits the first RF signal to the at least one of the plurality of appliance control units.

21. The system of claim 18, further comprising means for receiving by the energy management controller a demand reduction instruction from operators of an energy delivery system such that the step of generating the demand reduction control signal is made in response to the received demand reduction instruction.

22. The system of claim 18, further comprising:

means for receiving a demand reduction instruction, the demand reduction instruction having at least a requested amount of demand reduction;

means for determining a difference between the determined first aggregate change in demand with the requested amount of demand reduction;

means for generating a second demand reduction control signal;

means for transmitting a third RF signal corresponding to the second demand reduction control signal to a plurality of third transceivers, wherein each one of the third transceivers resides in one of a second plurality of appliance control units, and wherein each one of the second plurality of appliance control units is coupled to the at least one appliance;

means for shutting off the at least one of the appliances coupled to the second plurality of appliance control units in response to receiving the third RF signal;

means for metering a second change in demand at a plurality of second meters;

means for transmitting a plurality of fourth RF signals corresponding to one of a plurality of second changes in demand to the energy management controller from a plurality of fourth transceivers, each one of the fourth transceivers coupled to one of the plurality of second meters; and

means for determining a second aggregate change in demand, the second aggregate change in demand equaling the sum of the plurality of second changes in demand.

23. The system of claim 22, further comprising means for selecting a number of appliance control units to be members of the second plurality of appliance control units such that the second aggregate change in demand substantially equals the difference between the first aggregate change in demand and the demand reduction instruction selecting the number of appliance control units to be members of the second plurality of appliance control units such that the second aggregate change in demand substantially equals the difference between the first aggregate change in demand and the requested amount of demand reduction.

24. The system of claim 18, further comprising:

means for generating a terminating signal; and

means for transmitting a third RF signal corresponding to the terminating signal from the energy management controller to the plurality of appliance control units such that the demand reduction control signal is ended.

25. The system of claim 24, further comprising:

means for metering a second change in demand at each one of the plurality of meters after the demand reduction control signal is ended;

means for determining a second aggregate change in demand, the second aggregate change in demand equaling the sum of the metered second change in demand at each one of the plurality of meters; and

means for comparing the second aggregate change in demand with an aggregate metered demand determined before the demand reduction control signal is ended.

26. The system of claim 25, further comprising:

means for selecting a number of appliance control units to be members of a second plurality of appliance control units;

means for generating a second demand reduction control signal;

means for transmitting the second demand reduction control signal to the second plurality of appliance control units, each one of the second plurality of appliance control units coupled to the at least one appliance; and

means for shutting off each one of the appliances coupled to the second plurality of appliance control units in response to receiving the second demand reduction control signal such that a third aggregate change in demand substantially equals a difference between the second aggregate change in demand and the aggregate metered demand determined before the demand reduction control signal is ended.

27. The system of claim 18, further comprising:

a first interface coupled to the energy management controller and a communication network; and

a second interface coupled to a site controller and the communication network, the site controller configured to communicate at least the second RF signal such that communications between the energy management controller and the site controller are communicated over the communication network.

28. The system of claim 27, wherein the communication network is a public switched telephone network.

29. The system of claim 27, wherein the communication network is a utility legacy communication system.

30. The system of claim 27, wherein the communication network is a digital communication system.

31. The system of claim 27, wherein the communication network is a radio frequency (RF) communication system.

32. The system of claim 27, wherein the communication network is an Internet network.

33. A system for controlling demand in an energy delivery system comprising:

(1) an energy management controller configured to

communicate a demand reduction control signal to a plurality of appliance controller transceiver units, each of the appliance controller transceiver units coupled to at least one appliance such that the appliance is shut off upon receipt of the demand reduction control signal; and

communicate with a plurality of meter transceiver units, each of the meter transceiver units coupled to at least one meter configured to detect demand, and each configured to transmit a radio frequency (RF) signal corresponding to the metered demand; and

(2) a site controller transceiver configured to receive the RF signals corresponding to the metered demand from the plurality of meter transceiver units, such that the energy management controller determines a difference between the metered demand before communication of the demand reduction control signal and after the received RF signals.

34. The system of claim 33, wherein the meter transceiver units generate a second RF signal corresponding to the amount of demand detected by the meters before the RF demand reduction control signal is received, and wherein the meter transceiver units generate a third RF signal corresponding to the amount of demand detected by the meters after the appliances are shut off.

35. The system of claim 33, wherein the meter transceiver units determine a change in demand corresponding to the amount of demand detected by the meters before the RF demand reduction control signal is received and the amount of demand detected by the meters after the appliances are shut off, such that the second RF signal corresponds to the determined change in demand.

36. The system of claim 33, further comprising an energy management controller memory having a database identifying each one of the plurality of appliance controller transceiver units and each one of the meter transceiver units uniquely identified with an identification code.

37. The system of claim 36, further comprising logic residing in the energy management controller memory configured to select ones of the appliance controller transceiver unit identification codes such that when the demand reduction control signal is generated, only the selected ones of the plurality of appliance controller transceiver units recognize the received demand reduction control signal such that only the corresponding appliances are shut off.

38. The system of claim 37, wherein the energy management controller selects at least one load block from a plurality of load blocks such that an estimated energy demand decrease of the selected load block corresponds to a desired magnitude of the demand reduction control signal, and such that the selected load block corresponds to the selected ones of the plurality of appliance controller transceiver units.

39. The system of claim 33, further comprising a means for communicating information to components residing in an energy delivery system control center, the communicating means coupled to the energy management controller, such that operators understand the determined difference between the metered demand information before generation of the demand reduction control signal and the metered demand information after generation of the demand reduction control signal.

40. The system of claim 33, further comprising a means for receiving an instruction from components residing in an energy delivery system control center, the instruction receiving means coupled to the energy management controller such that the demand reduction control signal is generated when the instruction is received.

41. The system of claim 33, further comprising:

a first interface coupled to the energy management controller and a communication network; and

a second interface coupled to the site controller transceiver and the communication network such that communications between the energy management controller and the site controller transceiver are communicated over the communication network.

42. The system of claim 41, wherein the communication network is a public switched telephone network.

43. The system of claim 41, wherein the communication network is a utility legacy communication system.

44. The system of claim 41, wherein the communication network is a digital communication system.

45. The system of claim 41, wherein the communication network is a radio frequency (RF) communication system.

46. The system of claim 41, wherein the communication network is an Internet network.

47. A system which controls appliances comprising:

at least one appliance controller unit, the appliance controller unit coupled to at least one appliance;

an energy management controller configured to communicate a demand reduction control signal;

a site controller configured to receive the demand reduction control signal and configured to communicate a first radio frequency (RF) signal corresponding to the demand reduction signal;

a first transceiver residing in the appliance controller unit and configured to receive the first RF signal so that the appliance coupled to the appliance controller unit is shut off upon receipt of the first RF signal;

a second transceiver coupled to a meter, the meter configured to detect demand, and configured to communicate a second RF signal corresponding to the metered demand to the site controller before the first transceiver receives the first RF signal, and further configured to communicate a third RF signal corresponding to the metered demand to the site controller after the appliance coupled to the appliance controller unit is shut off,

wherein the second RF signal and the third RF signal are received by the site controller, and wherein information corresponding to the second RF signal and the third RF signal is communicated by the site controller to the energy management controller.

48. The system of claim 47, further comprising:

a first interface coupled to the energy management controller and a communication network; and

a second interface coupled to the site controller and the communication network such that communications between the energy management controller and the site controller are communicated over the communication network.

49. The system of claim 48, wherein the communication network is a public switched telephone network.

50. The system of claim 48, wherein the communication network is a utility legacy communication system.

51. The system of claim 48, wherein the communication network is a digital communication system.

52. The system of claim 48, wherein the communication network is a radio frequency (RF) communication system.

53. The system of claim 48, wherein the communication network is an Internet network.

54. A system which controls appliances comprising:

at least one appliance controller unit, the appliance controller unit coupled to at least one appliance;

an energy management controller configured to communicate a demand reduction control signal;

a site controller configured to receive the demand reduction control signal and configured to communicate a first radio frequency (RF) signal corresponding to the demand reduction signal;

a first transceiver residing in the appliance controller unit and configured to receive the first RF signal so that the appliance coupled to the appliance controller unit is shut off upon receipt of the first RF signal;

a second transceiver coupled to a meter, the second transceiver configured to determine a first demand detected by the meter before the RF demand reduction control signal is received, configured to determine a second demand detected by the meter after the appliance coupled to the appliance controller unit is shut off, configured to determine a change in demand corresponding to a difference in the first demand and the second demand, and configured to communicate a second RF signal corresponding to the determined change in demand to the site controller,

such that information corresponding to the determined change in demand is communicated by the site controller to the energy management controller.

55. The system of claim 54, further comprising:

a first interface coupled to the energy management controller and a communication network; and

a second interface coupled to the site controller and the communication network such that communications between the energy management controller and the site controller are communicated over the communication network.

56. The system of claim 55, wherein the communication network is a public switched telephone network.

57. The system of claim 55, wherein the communication network is a utility legacy communication system.

58. The system of claim 55, wherein the communication network is a digital communication system.

59. The system of claim 55, wherein the communication network is a radio frequency (RF) communication system.

60. The system of claim 55, wherein the communication network is an Internet network.

61. A method for controlling demand in an energy delivery system, the method comprising the steps of:

generating a demand reduction control signal by an energy management controller;

transmitting a first radio frequency (RF) signal corresponding to the demand reduction control signal to a plurality of first transceivers, each one of the first transceivers residing in one of a plurality of appliance control units, wherein each one of the plurality of appliance control units is coupled to at least one appliance;

metering a first metered demand at a plurality of meters, each one of the meters coupled to one of the appliances;

transmitting a plurality of second RF signals each corresponding to one of the plurality of first metered demands to the energy management controller from a plurality of second transceivers, each one of the second transceivers coupled to one of the plurality of meters;

shutting off the appliance coupled to the appliance control unit in response to receiving the first RF signal;

metering a second metered demand at the plurality of meters; and

transmitting a plurality of third RF signals each corresponding to one of the plurality of second metered demands to the energy management controller from the plurality of second transceivers.

62. The method of claim 61, further comprising the step of determining a first aggregate change in demand, the first aggregate change in demand equaling a sum of a difference between the plurality of first metered demands and the plurality of second metered demands.

63. A method for controlling demand in an energy delivery system, the method comprising the steps of:

generating a demand reduction control signal by an energy management controller;

transmitting a first radio frequency (RF) signal corresponding to the demand reduction control signal to a plurality of first transceivers, each one of the first transceivers residing in one of a plurality of appliance control units, wherein each one of the plurality of appliance control units is coupled to at least one appliance;

shutting off the appliance coupled to the appliance control unit in response to receiving the first RF signal;

metering a first demand at a plurality of meters before the appliance is shut off, each one of the meters coupled to one of the appliances;

metering a second demand at the plurality of meters after the appliance is shut off;

determining a change in demand corresponding to a difference between the first metered demand and the second metered demand; and

transmitting a plurality of second RF signals to the energy management controller from a plurality of second transceivers, the second RF signals each corresponding to the respective determined change in demand, and wherein each one of the second transceivers is coupled to one of the plurality of meters.

64. The method of claim 63, further comprising the step of determining a first aggregate change in demand, the first aggregate change in demand equaling a sum of the plurality of determined changes in demand.